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U Pegasi, Pickering concludes that the star exhibits a principal and secondary minimum, at magnitudes 9.90 and 9.75 respectively, in a period of nine hours. Chandler, however (*Astronomical Journal*, XVIII., p. 140), regards this difference between the minima too slight to be conclusive, and derives from his own observations (with the omission of his first estimates by which he discovered the star's variability) a simple, symmetrical light curve, with a period of four and one-half hours.

The number of variables in star clusters discovered by Bailey on the Harvard plates has been increased by his further study of them, so that now the clusters ω Centauri, Messier 3, Messier 5 and N. G. C. 7078 have been found to contain, respectively, 122, 132, 85 and 51 variable stars, or 390 in all.

E. B. F.

NOTES ON INORGANIC CHEMISTRY.

SOME weeks since attention was called in these notes to the formation of ammonium peroxid, or rather a compound of ammonium peroxid and hydrogen peroxid, by P. Melikoff and L. Pissarjewsky at the University of Odessa. To this compound, which is formed by the action of ethereal solution of ammonia upon a similar solution of hydrogen peroxid, the formula $(\text{NH}_4)_2\text{O}_2 \cdot 2\text{H}_2\text{O}_2 \cdot 10\text{H}_2\text{O}$ was given. An article in the last *Berichte* gives further particulars of the compound and assigns the formula $(\text{NH}_4)_2\text{O}_2 \cdot \text{H}_2\text{O}_2 \cdot \text{H}_2\text{O}$. The water is considered as water of crystallization, and is apparently not constant, as in one specimen the water present corresponded to $(\text{NH}_4)_2\text{O}_2 \cdot \text{H}_2\text{O}_2 \cdot \frac{1}{2}\text{H}_2\text{O}$. It is possible, however, to consider the substance as $\text{NH}_4\text{O}_2\text{H}$, the peroxid of ammonium hydroxid. From the relative stability of ozone and hydrogen peroxid it is not improbable that their constitutional formulæ should be written $\text{O}=\text{O}^{\text{iv}}=\text{O}$ and $\begin{smallmatrix} \text{H} \\ > \end{smallmatrix} \text{O}^{\text{iv}}=\text{O}$, one atom of

oxygen being considered quadrivalent. If this be the case, the formula of ammonium peroxid might be $\begin{smallmatrix} \text{NH}_4 \\ \text{H} \end{smallmatrix} > \text{O}^{\text{iv}}=\text{O}$.

IN the same *Berichte* account is given of some new compounds in which a part of the oxygen in sulfates and phosphates is replaced by fluorin. Types of these compounds are $\text{HK}_3\text{S}_2\text{O}_7\text{F}_2 \cdot \text{H}_2\text{O}$ and $\text{HRbPO}_3\text{F} \cdot \text{H}_2\text{O}$. These interesting substances are fairly stable and are closely related to the fluoriodates, not long since discovered by Professor Weinland, to whom we are also indebted for these fluosulfates and fluorophosphates.

AT the last meeting of the Chemical Society (London) a paper was read by W. A. Shenstone and Beck, on the influence of the silent discharge of electricity on atmospheric air. At first there is a large contraction and this is followed by a re-expansion to nearly the original volume, and a trace of nitrogen peroxid is present.

The explanation offered is that at first the oxygen in the air is condensed to ozone. In air it appears that owing to dilution with an inert gas, nitrogen, from 80 % to 90 % of the oxygen can be converted into ozone. This causes the first contraction. When the oxygen is almost completely changed into ozone some small amount of nitrogen dioxid is formed. This at once attacks the ozone molecule and breaks it down under the influence of the silent discharge, and the gas returns to its original volume. As confirmatory of this theory is the fact that not a trace of ozone can be made in the presence of nitrogen peroxid.

J. L. H.

SCIENTIFIC NOTES AND NEWS.

THE ALLEGHENY OBSERVATORY.

PROFESSOR JAMES E. KEELER has written a letter to the Chairman of the Observatory Committee stating that he is prepared to decline the call to the Directorship of the Lick Obser-

vatory if within two weeks \$200,000 can be collected for the erection of a new observatory and for other purposes. The Trustees have adopted the following resolutions:

"WHEREAS, The Board of Trustees of the Western University has received a communication from Professor James E. Keeler, Director of the Allegheny Observatory, announcing his election to the Directorship of the Lick Observatory, it is

"*Resolved*, That we place upon record our mingled feelings of pride and regret; pride because he has been chosen to fill the highest position in the astronomical world, because the choice has fallen upon one whom we love and honor as a friend, and whose career was begun in connection with this institution, and who during his more recent connection with it as its Director has shed upon it the luster of brilliant scientific discoveries; regret because this election, so honorable to him, if accepted, will terminate the relations which have been to us a source of profound satisfaction and pleasure.

"*Resolved*, That the intimation which he gives to us, that if we shall secure within the next two weeks the sum of money necessary to place our observatory in a position which will make it worthy of its past illustrious history, and of the great community in which it is located, he will remain with us, fills us with hope, and we pledge ourselves to endeavor by all the means at our command to secure this result.

"*Resolved*, That to this end we call upon all those in this community who have civic pride and an interest in the promotion and advancement of knowledge to aid us in this effort to secure the sum of \$200,000, which, in the judgment of this Board, is necessary in order to build and equip a new observatory and to provide a sum sufficient to complete the endowment of the chair of astronomy.

"*Resolved*, That we record with grateful appreciation the kind response that has already been made by our fellow-citizens, who have thus far subscribed to this cause the sum of \$137,000.

"Be it further *Resolved*, That a committee, consisting of the President of the Board, Dr. John Krockar White; Mr. John A. Brashear,

Chairman of the Observatory Committee, and the Chancellor, Dr. W. J. Holland, be appointed to present to the public, through the columns of the press, the urgent need which exists for immediate action, and to appeal to all liberally disposed persons to aid us by their contributions, whether large or small, so that the high standing of the Allegheny Observatory, which has heretofore occupied the foremost place among like institutions in this country; may be still maintained, and that it may be restored to the rank which it deserves to hold, but which it has in part lost through its meager endowment, and through the encroachment of manufacturing industries in its immediate neighborhood."

GENERAL.

THE British Association for the Advancement of Science will be invited to meet at Bradford in 1900.

THE German Zoological Society will hold its eighth annual session at Heidelberg from the first to the third of June under the presidency of Professor T. E. Schulze. In addition to papers and demonstrations, reports will be presented from the editor of *Das Thierreich* and from the delegate to the International Commission on Nomenclature. Professor J. W. Spengel (Giessen) has been elected Secretary of the Society.

THE twelfth annual meeting of the German Anatomical Society will be held at Kiel from the 17th to the 20th of April.

THE Scientific Alliance of New York gave a dinner at the Hotel Savoy on March 16th, with about 170 guests in attendance. Mr. Charles F. Cox, President of the Council of the Alliance, presided. The scientific program was as follows:

Science as a Moral Force: CHANCELLOR H. M. MACCRACKEN.

Science in Education: HON. SETH LOW.

Science, the Nation's Safeguard: PROFESSOR SIMON NEWCOMB.

The City's Debt to Science: PROFESSOR J. J. STEVENSON.

Science and Commerce: HON. WM. E. DODGE.

The Interest of Sister Cities in the Science of New York: PROFESSOR GEO. F. BARKER.

Science for the People: PROFESSOR HENRY F. OSBORN.

Science in Warfare: CAPT. E. L. ZALINSKI.

Reference was made in the speeches to the debt of New York City to science, and the hope was expressed that the city would in return give the societies a building for their meetings and for the establishment of a scientific center in the city. The report of the building committee of the Alliance will be found elsewhere in this issue of SCIENCE.

THE National Geographic Society held its annual reception in the Corcoran Art Gallery on March 16th. President Alexander Graham Bell and the following members of the Board of Managers received the guests: Messrs. F. V. Coville, W. H. Dall, David T. Day, Henry Gannett, G. K. Gilbert, A. W. Greely, John Hyde, W. J. McGee, C. Hart Merriam, H. G. Ogden and Miss E. R. Scidmore. These were assisted by Miss E. M. Bell, Mrs. Dall, Mrs. Coville, Mrs. McGee, Mrs. Gilbert, Mrs. H. F. Blount, Mrs. Day, Mrs. Gannett, Mrs. Greely, Mrs. Hyde, Mrs. Merriam and Mrs. Ogden.

DR. B. H. WARREN, the State Zoologist of Pennsylvania, has tendered his resignation to Secretary Edge, of the Board of Agriculture. Dr. Warren, according to the *Philadelphia Ledger*, says in his letter: "Governor D. H. Hastings, on the day of his departure for the Pacific coast, directed a mutual friend to interview me and request that I should support the Anti-McCauley delegates to the State Convention. This I positively declined to do." After further brief discussion of his position as a supporter of the McCauley-Quay interests, Dr. Warren closes his letter, after expressing thanks to Governor Hastings and Secretary Edge for courtesies extended, as follows: "As my attitude seems to be at variance with what Governor Hastings desires, and as I believe he should be surrounded with officials who will be in full accord with his political views, I to-day sever my official connection with your Department, and shall esteem it a favor if you will kindly, at your earliest convenience, communicate this to the Governor." The attitude of Governor Hastings in regard to the State Zoologist ap-

pears to be most unfortunate, but we cannot greatly regret the resignation of a State Zoologist who believes that he should be in 'full accord with the political views' of the Governor.

PROFESSOR GRIMAUX, member of the Paris Academy, has been deprived of his chair in the École Polytechnique, Paris, owing to his testimony at the trial of M. Zola. We learn from *The British Medical Journal* that at a recent meeting of the Biological Society the assembled members (numbering 40) decided to express to Professor Grimaux their sympathy and esteem for him. When Professor Grimaux appeared at the meeting all present rose, and Professor Richet made the following speech: "It is the custom at the Biological Society to congratulate its members when an honor is conferred on them, or when a memorable event occurs in their career. To-day we offer the homage of our affection to M. Grimaux, our master, our friend and our colleague. He has been severely treated. It is not for us to criticize this act, but we desire to express to him the admiration, the respect and sympathy which animate the hearts of us all." M. Grimaux, who was considerably affected by this expression of sympathy, replied: "Certainly the law has been violated. Witnesses who give evidence according to their conscience should be protected. I repeat, I listened only to the dictates of my conscience. I swore to tell the truth and I told it. I am prepared always to do my duty in the same way."

DR. TH. W. ENGELMANN has been elected a member of the Berlin Academy of Sciences.

THE Belgian Academy of Sciences has elected as foreign members: Professors F. Klein, Göttingen; G. Salmon, Dublin; E. Haeckel, Jena; J. B. A. Chauveau, Paris; W. Pfeffer, Leipzig, and A. de Lapparent, Paris.

PROFESSOR W. PFEFFER, whose great work on *Pflanzenphysiologie* was reviewed in a recent number of this JOURNAL, was invited to give the Croonian lectures before the Royal Society on March 17th. Cambridge University will confer upon him the degree of Doctor of Science.

We learn from *Nature* that more than 100 foreign zoologists have now consented to be mem-

bers of the 'Committee of Patronage' of the Fourth International Congress of Zoology, and a large number of them have expressed the hope that they will be able to be present at the meeting in August next. Among these may be mentioned the names of Professor Hæckel, of Jena; Professor Graff, of Graz; Professor Grassi, of Rome; M. Blanchard, of Paris; Baron Jules de Guerne, who has been associated with the Prince of Monaco; Dr. Jentink, of Leyden, who was President of the Third Congress; Dr. Dollo, of Brussels; and Professor Collett, of Christiania. From the United States it is expected that there will be a somewhat large contingent, including Professors Osborn, Scott, Wilson and Watasé.

It is proposed to erect, by international subscription, a monument to Buysballot, the eminent Dutch meteorologist, who died in 1890. Subscriptions may be sent to Dr. Mauritz Snel-len, Director of the Meteorological Institute, Bilt, near Utrecht.

JOSÉ D' ANCHIETÁ, a zoologist who has made important collections and observations in the Portugese African possessions, died in Caconda (Angola), on September 14th last, at the age of 66 years. J. Hoyes Panton, professor of biology and geology at the Ontario Agricultural College, Canada, died at Ontario on March 2d.

Two generous benefactors of educational institutions have died during the week, Mr. Jacob Tome, who endowed the Jacob Tome Institute, at Port Deposit, Md., with \$2,000,000, and Mr. Thomas McKean, who gave the University of Pennsylvania sums aggregating \$300,000.

THE Academy of Medicine, Paris, has awarded the Monbinne prize of \$300 to Dr. Huguét, army surgeon, to enable him to continue his scientific mission for exploring Mount Zab.

DR. CARL LUMHOLTZ and Dr. A. Hrdlicka have left New York for Mexico to study the Mexican Indians and antiquities.

REUTER'S Agency is informed that the plans have been formed by Major Gibbons for the forthcoming expedition through Africa from south to north. The primary object of the journey is the continuation of the valuable

geographical work already accomplished by the explorer on the Zambesi, after which it is hoped to continue the journey *via* the Great Lakes to the Nile, and thence, if the political situation then permits, down that river to Cairo, thereby accomplishing a through journey from Cape Town to Cairo, or, failing that, to reach the West Coast *via* the Congo. An interesting feature of the expedition is the employment of specially constructed aluminium launches and barges, which can be taken to pieces and put together again, thus enabling the expedition to be divided into as many as four sections. In addition to a grant from the Royal Geographical Society, Major Gibbons is receiving support from certain government departments, for whom he will do special work. Major Gibbons hopes to make the whole journey in about 18 months.

THE Zurich correspondent of the London *Times* writes that the observatory of Mont Blanc, which was constructed by M. Joseph Vallot some seven years ago, is to be transferred to another site. The present structure is built on a small rocky plateau, which extends for a short distance from the Rochers des Bosses, but its position is no longer favorable for scientific observations. The construction of the building has served as a barrier against which the snow piles itself in ever-increasing masses, causing both trouble and expense to the observatory staff. The whole erection is to be transferred, piece by piece, on the backs of workmen from the Rochers des Bosses to a rocky point at the same altitude, where the ground will first be levelled by blasting, and, in spite of the difficulties of climate and transport attending these operations, it is hoped that the whole transfer will be finished in the course of one summer season.

THE Russian Society of Geography proposes to establish a meteorological station on Elbrouz, in the Caucasus, at an altitude 5,636 meters.

MR. CARNEGIE has given \$10,000 to the Carnegie Library, Pittsburg, for the purchase of scientific books.

WE have already announced the fact that the American Women's Committee have succeeded in securing subscriptions for a table for women at

the Zoological Station at Naples. Efforts are now being made to collect a second sum of \$500 for the expenses of the holder of the table. Four subscriptions of \$50 have been received, the subscribers being: Bryn Mawr College, Sage College of Cornell University, the women students of Brown University and Miss L. V. Sampson.

THE House of Representatives has agreed to the conference report on the Legislative, Executive and Judicial Appropriation Bill. As passed, it provides for a new division for the Patent Office and the opening of the Library of Congress at night after October 1st next.

AN exhibition of the Durr Light was given, on Wednesday, the 23d inst., from 7 to 9 p. m., in the Court of the Library Building, Columbia University. The light is generated by automatic evaporation and superheating of vapors of ordinary kerosene, without employing compressed air, and is odorless and smokeless. Lamps of 1,500 and 3,500 candle-power were used.

THE German Balneological Society held its ninth public meeting on March 11th and following days in Berlin, under the presidency of Professor Liebreich, who delivered the opening address. Among the communications were: 'The Question of Contagiousness of Tuberculosis,' by Dr. Römpler, of Görbersdorf; the 'Effect of the so-called Indifferent Mineral Waters,' by Professor Liebreich; the 'Hydrotherapy of Simple Ulcer of the Stomach,' by Professor Winternitz, of Vienna, and 'Vegetable Diet Cures,' by Dr. Strosser, of Vienna.

THE fourth Congress for the Study of Tuberculosis will be held at Paris from the 27th of July to the 2d of August, under the presidency of M. Nocard.

THE annual spring exhibition of the Massachusetts Horticultural Society will be held at Horticultural Hall, 101 Tremont street, opening on March 22d, and lasting four days. Prizes to the amount of eleven hundred and thirty dollars will be awarded.

A COMMITTEE of the American Chemical Society consisting of E. E. Ewell, Chairman, Washington, D. C.; G. E. Barton, Millville, N. J.; C. E. Linebarger, Chicago, Ill.; F. P. Ven-

able, Chapel Hill, N. C., and L. P. Kinnicutt, Worcester, Mass., has been appointed to study and report upon the means by which the Society can hasten the adoption of uniform systems of graduation, definite limits of accuracy and standard methods for using all forms of measuring instruments in use in chemical laboratories. Further the committee has been instructed to cooperate with other scientific bodies which have already undertaken this work, or which may enter upon it in the future.

THE *Revue des Revues* contains an illustrated account of the laboratory of physiological psychology at the Sorbonne, under the auspices of the École des Hautes-Études, directed by M. Binet. It appears from the article that in addition to the laboratories at Paris there are laboratories at Rennes, Louvain, Liège and Geneva.

THE public libraries division of the University of the State of New York, following recent precedent, has issued a list of '500 leading books,' selected from the 4,928 published in 1897. This list was submitted to the librarians of the State, to 'obtain an expression of opinion respecting the best 500 books of 1897 for a village library.' The result of 157 replies shows, as might be expected, that the favorite books are novels. Five books on natural science were indeed included, but confined to the popular study of birds and insects.

At a meeting of the Zoological Society of London on February 15th Mr. G. A. Boulenger, F. R. S., described a new species of Sea-snake from Borneo, which he proposed to name *Hydrophis flouvi*, after Mr. Stanley Flower, its discoverer. Mr. Boulenger also gave an account of the Reptiles and Batrachians lately collected by Mr. W. F. H. Rosenberg in western Ecuador. Seventy-seven species were enumerated, of which twenty-three, viz.: eleven Reptiles and twelve Batrachians, were described as new.

THE London Local Government Board has given orders that the new form of vaccine mixed with glycerine is to be served out to all vaccination officers following upon the recommendations of the Special Commission on Vaccination, which recently examined all the

great vaccination departments of foreign governments. This is to be undertaken at once without regard to the vaccination legislation promised in the Queen's Speech, and will be completely independent of such a measure. Some delay has arisen in sending out the new lymph, owing to the want of a special laboratory for the cultivation of the matter, but this will not now be long delayed, as soon as the Local Government Medical Board is granted funds to purchase or secure a laboratory.

It is stated in *Industries and Iron* that Herr Wachnitz, a German engineer, has succeeded in plating aluminium with copper by a welding process. It is stated that the plated sheets can easily be soldered, grooved, tinned and nicked. The plating may be of any thickness desired, and even with the thinnest sheets there is no separation when rolled or drawn. Large sample sheets have already been submitted to the inspection of the Imperial Navy Department and other large manufacturing concerns. The obstacles to a still wider use of aluminium, which could be expected in view of its great lightness, have been its poor ability to solder, its weak power of resistance to numerous fluids, and the further fact that paint does not adhere to it very well. All these objections would be removed by this invention.

PROFESSOR NERNST, of Göttingen, has made an important improvement in the efficiency of the incandescent light, the first authentic account of it that we have noticed being contributed to the *Electrical World* by Dr. H. Lux, editor of the *Zeitschrift für Beleuchtungswesen*. Dr. Lux explains that as long as carbon filaments are used in incandescent lights the efficiency of the system will probably not be much increased. Professor Nernst uses the so-called conductors of second class, such as chalk, magnesia and kaolin, materials that, when cold, have an extremely high resistance to the current, so high indeed that they might be called insulators, the resistance falling greatly at high temperatures. These materials are notable for the large proportion of visible light rays in their radiation. The lime light and the Welsbach incandescent gaslight are notable instances of the application of this principle. As Professor

Nernst says in a letter, these materials have a higher emission of light, as they are not in the sense of Kirchhoff absolutely 'black substances.' If these materials are raised to a sufficiently high temperature, no matter by what means, the efficiency of production of light is remarkably high. Professor Nernst applies as the means to bring the bodies to a high temperature the electric current, conducting it by small staffs of magnesia, chalk or other materials, after having prepared them to conduct the current by warming them. It is necessary to work with alternating currents to avoid electrolytic action on the material employed. The importance of this invention, if it can be practically employed—Professor Nernst, a true scientific man, advises us not to be too hopeful—would be very great, as the cost of incandescent lighting would be reduced to about one-third of the present rate.

UNIVERSITY AND EDUCATIONAL NEWS.

THE bill before the Maryland Legislature for an annual appropriation of \$100,000 to the Johns Hopkins University was reported unfavorably on March 16th by the Committee on Ways and Means, and the House, by a vote of 50 to 17, refused to substitute the bill for the unfavorable report. The Senate is, however, more favorably disposed to the bill, and it is possible that a compromise may be effected by which at least part of the appropriation may be made.

THE eighth annual report of President Low, of Columbia University, presented to the Trustees on October 4th, has been published, together with the reports of the Deans of the various schools, of the Librarian and of the Treasurer. President Low takes the removal to the new site as the occasion for comparing the present condition of the University with that of the College when in 1857 it moved to 49th Street, and when in 1889-90 he was installed as President. In 1847 there were 14 members of the Faculty; in 1890 there were 176 officers of instruction, while there were 289 in 1897. The receipts of the University for current expenses were about \$775,000 and the excess of disbursements over receipts was about \$34,000. The average annual increase in the